E. Remarks

Claims 1-13 are pending. Claims 1-13 have been amended. Consideration of the amended claims is respectfully requested.

Objections

The Examiner has objected to claims 4-13 under 37 C.F.R. § 1.75(c), as being in improper form because a multiple dependent claim cannot depend from any other multiple dependent claim.

In response, Applicant has amended the claims to correct the improper multiple dependency.

The Examiner has objected to the specification for containing the term [sic] at the bottom of page 12 and the top of page 13. In response, Applicant respectfully submits the attached substitute specification and abstract marked up to show all the changes from the originally submitted specification and abstract. For convenience, Applicant also submits a clean version of the specification. Applicant believes the substitute specification and abstract are a better translation of the priority document because they employ terms more commonly used by the skilled artisan. Applicant believes, however, that the originally submitted specification was an accurate translation of the priority document.

The Examiner has also objected to Figure 1b for not showing "10c". The Examiner has suggested changing "10" in Figure 1b to "10c". In response, Applicant submits herewith a corrected Figure 1b in which "10" has been replaced with "10c" as suggested by the Examiner.

Rejections Under 35 U.S.C. § 112

The Examiner has rejected claims 1-3 under 35 U.S.C. § 112, second paragraph as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The Examiner specifically states that in Claim 1 it is unclear if the description of "base" requires a "cap". In response, Applicant has amended the Claim 1 to indicate that the tread is comprised of an electrically insulating material, rather than "having a base of an electrically insulating material." Support for this amendment is found in the originally filed specification at page 8, lines 1-2, and in the substitute specification at page 5, paragraph 35. Applicant believes that this amendment to the claims is clear and therefore respectfully requests withdrawal of the rejection.

The Examiner further alleges that the scope and meaning of the phrase "it contains on its circumference" is ambiguous and has suggested using the term "arranged" to clarify the meaning of the claims. Applicant has accordingly amended the claims to indicate that the tread comprises at least one conductive layer arranged to substantially connect the lateral faces together. Therefore, Applicant respectfully requests withdrawal of this rejection.

The Examiner has rejected claim 2 under 35 U.S.C. § 112 for including the phrase "illegible handwriting." Applicant has amended the claims to remove this phrase and therefore requests withdrawal of the rejection.

The Examiner has rejected claim 2 under 35 U.S.C. § 112 alleging that the phrase "at least one of them" is unclear. Applicant has amended the claims to recite "at least one

of said lateral faces."

The Examiner has rejected claims 2 and 3 under 35 U.S.C. § 112 alleging that the phrase "interrupted opposite" is unclear. Applicant respectfully traverses this rejection. As is made clear in the originally filed specification at page 11, lines 10-17, in the substitute specification at page 9 paragraph 59-62, and by Fig. 1a, the phrase "interrupted opposite" means that, even if the conductive layer substantially connects the lateral faces or the inner and outer tread faces, this layer may be interrupted, i.e. it is at a distance from at least one of the lateral faces and/or from at least one of the inner and outer tread faces. Therefore, Applicant respectfully requests withdrawal of this rejection.

Rejections under 35 U.S.C. § 102

The Examiner has rejected claim 1 under 35 U.S.C. § 102(b) as allegedly anticipated by Fielding (U.S. Patent No. 2,342,576). The Examiner contends that Fielding, Fig. 5, shows a conductive layer arranged between an upper layer of non-conducting, high resistivity material and a lower layer of non-conducting, high resistivity material. The Examiner further contends that Fielding teaches that the conductive layer joins the sidewalls, as claimed.

The present invention relates to a tread of a tire as illustrated in Fig. 1. The tread is defined by a radially inner face 2 (intended to be facing the different reinforcements of a tire which are not shown in the figure), by a radially outer face 3 (intended to be in contact with the ground when traveling), and by two lateral faces 4 and 5 connecting together the two facing pairs of lateral edges 6, 7 and 8, 9 of faces 2 and 3. Fig. 1 further shows that the tread which is largely made up of an electrically insulating material, such as silica,

comprises, running along its circumference, a least one conductive layer 10 which substantially connects the lateral faces 4 and 5 together, such that the insulating material is provided on both sides of the conductive layer. The tread may comprise a plurality of conductive layers.

Applicant wishes to point out that Fielding discloses a construction where a conductive layer is placed between a tread and a carcass. Fielding specifically teaches that the conductive layer underlies the tread (*see* first page, second column, lines 49-50). It is further taught in Fielding that the tire is made by building a tire carcass, placing the conductive layer upon this carcass, and then placing the tread material over the conductive material. *(See* second page, first column, lines 51-55). In addition, Fig. 5 of Fielding relates to a solid tire (*see* first page, second column, lines 18-20), not a tread of a pneumatic tire. In contrast, claim 1 relates to a tread of a pneumatic tire (including a pneumatic tire) which comprises a conductive layer, wherein the conductive layer is arranged to substantially connect lateral faces of the tread and wherein the insulating material is provided radially on both sides of the layer, not to a tire having a conductive layer placed on the carcass, and a conventional tread laid over the conductive layer, as taught by Fielding. Accordingly, Fielding does not anticipate claim 1. Therefore, Applicant respectfully requests withdrawal of the rejection of claims 1-3 under 35 U.S.C. § 102(b) as anticipated by Fielding.

The Examiner has rejected claim 1 under 35 U.S.C. §102(a) as allegedly anticipated by Japan '415 (JP 11-227415). The Examiner alleges that Japan '415 discloses a tread comprising an insulating material and a conductive rubber and that claim 1 encompasses

the tread shown in Fig. 2 and 3 of Japan '415. Applicant respectfully traverses the rejection.

Japan '415 is not prior art under 35 U.S.C. § 102(a) to the present invention because the priority date of the present invention is November 9, 1998 and Japan '415 issued on August 24, 1999. In accordance with 37 C.F.R. § 1.55(a)(4) and MPEP 201.15, Applicant submits herewith a translation of the priority document together with an Affidavit of Accuracy attached thereto. This translation shows that the present invention is fully supported and disclosed by the priority document. Accordingly, Japan '415 is not available as prior art under 35 U.S.C. § 102(a). Therefore, Applicant respectfully requests withdrawal of the rejection of claim 1 under 35 U.S.C. § 102(a) as anticipated by Japan '415.

Rejections Under 35 U.S.C. § 103(a)

The Examiner has rejected claims 2 and 3 under 35 U.S.C. § 103(a) as being allegedly unpatentable over Japan '415 in view of Aoki (U.S. Patent No. 5,397,616) or Europe '229 (EP 732229). The Examiner contends that it would have been obvious to mold the multilayer tread of Japan '415 such that the claimed "interruptions" are provided when looking to Aoki, which allegedly teaches molding circumferential grooves in a tread such that the lower tread layer is exposed for the benefit of preventing cracks, or when looking to Europe '229, which allegedly teaches forming circumferential grooves in a tread having a conductive layer and a silica layer. Applicant respectfully traverses the rejection.

As noted above, Japan '415 is not available as prior art. Therefore, it cannot not be combined with another reference for the purpose of rejecting the claims under 35 U.S.C. §

103(a). Therefore, Applicant respectfully requests withdrawal of the rejection under 35 U.S.C. § 103(a) as unpatentable over Japan '415 in view of Aoki or Europe '229.

The Examiner has also rejected claims 1-3 as being allegedly unpatentable over Verbrugghe (WO 98/38050) in view of Great Britain '757 (GB 544757) and optionally Aoki or Europe '229. The Examiner contends, as to Claim 1, that Verbrugghe is directed to an antistatic tread and discloses a tread having two insulating layers having a conducting strip insert extending through each layer, but does not disclose providing a conductive layer between the two insulating layers. The Examiner then alleges that it would have been obvious to coat the surfaces of the upper and lower layers of Verbrugghe with a conducting rubber cement of GB '757 to provide a conducting layer between the two insulating layers and that Aoki or Europe '229 provide the teaching of the claimed interruptions.

As to Claim 1, the Examiner contends that Great Britain '757 teaches an antistatic tire having a coating on the outer surface with a conductive layer, providing the motivation to coat the surfaces of each electrically insulating layer of Verbrugghe. The Examiner adds that Aoki and Europe '229 teach providing a tread having two layers with side faces so that the tread may be applied over the sidewall to add to Verbrugghe and Britain '757 a clear showing of the sidefaces of a two layer tread and the interruptions.

As to Claims 2 and 3, the Examiner alleges that it would have been obvious to mold the multilayer tread of Verbrugghe such that the claimed interruptions are provided in view of Aoki's suggestion to mold circumferential grooves and Europe '229's suggestion to form circumferential grooves in a tread having a conductive layer.

Applicant respectfully traverses this rejection of claims 1-3 under 35 U.S.C. §

103(a). As noted above, the present invention relates to a tread of a tire as illustrated in the figures. The tread is defined by a radially inner face 2 (intended to be facing the different reinforcements of a tire which are not shown in the figure), by a radially outer face 3 (intended to be in contact with the ground when traveling), and by two lateral faces 4 and 5 connecting together the two facing pairs of lateral edges 6, 7 and 8, 9 of faces 2 and 3. The tread includes an electrically insulating material, such as silica, comprises, a least one conductive layer 10 which substantially connects the later faces 4 and 5 together, such that the insulating material is provided radially on both sides of the conductive layer. The tread may comprise a plurality of conductive layers. Claim 1 recites a tread for a tire, defined laterally by lateral faces connecting radially inner and outer faces together, the tread being comprised of an electrically insulating material, characterized in that the tread has at least one conductive layer arranged to substantially connect the lateral faces together, wherein the insulating material is provided radially on both sides of the layer in the tread.

In stark contrast, Verbrugghe relates to an industrial tire, rather than a tread. Referring to Fig. 1, in the tire of Verbrugghe, the radially upper ply of the tread includes a vertical "fin" 11 (referred to in Verbrugghe as a ring-shaped insert) perpendicular to the surface of the running tread, which makes the upper ply conductive. *See* the Abstract. In addition, Verbrugghe discloses that the crown reinforcement 9 and the body reinforcement 1 are made conductive by a conductive mix which coats the cables and that the reinforcements are separated by a profile 6 made of a rubber mix slightly filled with silica. Verbrugghe further includes a conductive connection of electric charges which connects the running tread to the mounting rim, the connection being two conductive plies (or plies

being made conductive) 8, 9 and 1, separated by a non-conductive ply 7 and 6, which are linked by the connection to become conductive. Accordingly, moving from external to internal, the tire of Verbrugghe essentially has a conductive upper ply 8, which contacts the surface of a road, followed by a nonconductive ply 7, followed by another conductive reinforcement 9, followed by another nonconductive ply 6, and followed by another conductive reinforcement, providing for a tire with alternating conductive and nonconductive layers which Verbrugghe accomplishes, at least in part, by the inclusion of a vertical fin in the upper ply 8..

The Examiner contends that the conductive rubber cement of GB '757, when combined with Verbrugghe to coat the layers of the tread, makes the present invention obvious. GB '757 relates to a rubber cement composition that is electrically conductive. This composition is applied to the inner and outer surfaces of a tread to provide a reduction in the resistance from the ground to the rim of the tire. The skilled artisan looking to GB '757 would conclude that the rubber cement composition should be applied to the inner and outer surfaces of the tread of Verbrugghe, not internally in the tread because it would not serve to reduce resistance from the ground to the rim of the tire. Therefore, GB '757 actually teaches away from the present invention.

Moreover, as disclosed in the Abstract of Verbrugghe, Verbrugghe alternates conductive and non-conductive layers, i.e. two non-conductive layers are not provided next to each other. Assuming, *arguendo*, that the skilled artisan would be motivated to apply the rubber cement of GB '757 between the layers of Verbrugghe, including the conductive rubber cement of GB '757 between any two consecutive layers of Verbrugghe would result

in a conductive layer 8, followed by a conductive layer (rubber cement), which is then followed by a non-conductive layer 7. The present invention provides a conductive layer within the tread thus resulting in insulating material (nonconductive layer) on both sides. Therefore, the combination of Verbrugghe and GB '757 does not render the present claims unpatentable under 35 U.S.C. § 103(a).

Furthermore, the deficiencies of Verbrugghe and GB '757 are not remedied by Aoki or EP '229. The Examiner contends that Aoki and EP '229 provide the claimed interruptions. However, looking to Aoki and EP '229 to provide the claimed interruptions does not provide the missing claim elements which are not found in Verbrugghe and GB '757. Moreover, as noted above, Aoki is not prior art to the present invention and therefore, it cannot be combined with Verbrugghe and/or GB '757. And GB '229 does not disclose the claimed interruptions, which as indicated above, "interrupted opposite" means that, even if the conductive layer substantially connects the lateral faces or the inner and outer tread faces, this layer may be interrupted, i.e. it is at a distance from at least one of the lateral faces and/or from at least one of the inner and outer tread faces. Accordingly, Applicant respectfully requests withdrawal of the rejection of the claims under 35 U.S.C. § 103(a) as unpatentable over Verbrugghe in view of GB '757 and Aoki or EP '229.

<u>Double Patenting Rejections</u>

The Examiner has provisionally rejected claims 1-3 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-3 of the copending Application Serial No. 10/135,692.

Applicant has abandoned Application Serial No. 10/135,692 by not responding to

the outstanding Office Action. Therefore, the Examiner's double patenting rejection is moot.

F. Conclusion

In view of the foregoing remarks, favorable reconsideration and allowance of all pending claims is earnestly solicited. Applicant's undersigned attorneys may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,

John D. Murnane
Registration No. 29,836

Alicia A. Russo
Registration No. 46,192
Attorneys for Applicant

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3801
Facsimile: (212) 218-2200

Doc. Id. 431910

~~[Translation from French]~~ ~~-1-~~

~~PCT~~ ~~WORLD INTELLECTUAL PROPERTY ORGANIZATION~~
~~WIPO~~

~~International Office~~

~~INTERNATIONAL APPLICATION PUBLISHED IN ACCORDANCE WITH THE PATENT COOPERATION TREATY (PCT)~~

~~(51) International patent classification~~ [7]:
~~B60C 19/08, 11/00~~ ~~A1~~

~~(11) International publication number:~~ ~~**WO 00/27655**~~

~~(43) International publication date:~~ ~~May 18, 2000 (5/18/00)~~

~~(21) International application number:~~ ~~PCT/EP99/08555~~

~~(22) International filing date:~~ ~~November 8, 1999 (11/8/99)~~

~~(30) Priority data:~~
~~98/14/13~~ ~~November 9, 1998 (11/9/98)~~ ~~FR~~

~~(71) Applicants *(for all States designated except US)*: SOCIETE DE TECHNOLOGIE MICHELIN (FR/FR), 23, rue Breschet, F-63000 Clermont-Ferrand (FR). MICHELIN RECHERCHE ET TECHNIQUE S.A. (CH/CH), Route Louis Braille 10 et 12, CH-1763 Granges-Paccot (CH)~~

~~(72) Inventor; and~~
~~(75) Inventor/Applicant *(US only)*: POULBOT, Valéry (FR/FR), 12, rue Adélaide d'Orléans, F-63310, Randan (FR)~~

~~(74) Agent: RIBIERE, Joël, Michelin & Cie., SGD/LG/PI Department – LAD, F-63040 Clermont-Ferrand Cedex 9 (FR)~~

~~(81) States designated: JP, US, European Patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE)~~

~~Published: *With international search report.*~~

~~(54) Title: TIRE TREAD AND TIRE CONTAINING SAME~~

~~(57)~~

~~FOR INFORMATION ONLY~~

~~Codes used to identify States party to the PCT on the front pages of documents which publish international applications under the PCT.~~

TITLE

~~AL Albania ES Spain LS Lesotho SI Slovenia~~
~~AM Armenia FI Finland LT Lithuania SK Slovakia~~
~~AT Austria FR France LU Luxembourg SN Senegal~~
~~AU Australia GA Gabon LV Latvia SZ Swaziland~~
~~AZ Azerbaidjan GB United Kingdom MC Monaco TD Chad~~
~~BA Bosnia-Herzegovina GE Georgia MD Moldavia TG Togo~~
~~BB Barbados GH Ghana MG Madagascar TJ Tadjikistan~~
~~BE Belgium GN Guinea MK Former Yugoslav TM Turkmenistan~~
~~BF Burkina Faso GR Greece Rep. of Macedonia TR Turkey~~
~~BG Bulgaria HU Hungary ML Mali TT Trinity & Tobago~~
~~BJ Benin IE Ireland MN Mongolia UA Ukraine~~
~~BR Brazil IL Israel MR Mauritania UG Uganda~~
~~BY Belarus IS Iceland MW Malawi US United States~~
~~CA Canada IT Italy MX Mexico of America~~
~~CF Central African Republic JP Japan NE Niger UZ Uzbekistan~~
~~CG Congo KE Kenya NL Netherlands VN Vietnam~~
~~CH Switzerland KG Kirgistan NO Norway YU Yugoslavia~~
~~CI Ivory Coast KP Korean People's NZ New Zealand ZW Zimbabwe~~
~~CM Cameroon Democratic Republic PL Poland~~
~~CN China KR Korean Republic PT Portugal~~
~~CU Cuba KZ Kazakhstan RO Romania~~
~~CZ Czech Republic LC Saint Lucie RU Russian Federation~~
~~DE Germany LI Liechtenstein SD Sudan~~
~~DK Denmark LK Sri Lanka SE Sweden~~
~~EE Estonia LR Liberia SG Singapore~~

[Translation from French]

FRENCH REPUBLIC

NIIP

NATIONAL INSTITUTE OF INDUSTRIAL PROPERTY

PATENT OF INVENTION

CERTIFICATE OF UTILITY -- CERTIFICATE OF ADDITION

OFFICIAL COPY

The General Director of the National Institute of Industrial Property certifies that the document attached hereto is the copy certified to be in conformity with a request for a title of industrial property, filed at the Institute.

Done in Paris on 21 Oct. 1999

General Director of the
National Institute of Industrial Property

By: [Signature]
Martine Planche
Patent Department Chief

HEADQUARTERS
26 bis, rue de Saint-Pétersbourg
75800 Paris Cédex 8
Telephone: 01 53 04 53 04
Telecopier: 01 42 93 59 30

cerfa
No. 55-1328

NIIP
NATIONAL INSTITUTE OF
INDUSTRIAL PROPERTY

PATENT OF INVENTION
UTILITY CERTIFICATE
Industrial Property Code - Book VI

26 bis, rue de Saint-Pétersbourg
75800 Paris Cédex 8
Tel.: 01-53-04-53-04
Fax: 01-42-93-59-30

REQUEST FOR ISSUANCE
Confirmation of a deposit by fax: ☐
This form is to be filled out in black ink in all capital letters

Reserved for the NIIP

Date documents submitted:	*9 Nov. 98*
National registration No.	98 14113
Filing Department	99
Date of deposit:	9 Nov. 1998

1. **NAME AND ADDRESS OF APPLICANT OR AGENT TO WHOM ALL CORRESPONDENCE IS TO BE SENT:**

Manufacture Française des Pneumatiques MICHELIN
Michel BOLINCHES
SGD/LG/PI-LAD Department
63040 Clermont-Ferrand Cedex 9

No. of permanent power of attorney: PG 7112/7107

Correspondent's Reference: P10-1086 Telephone: 04-73-23-71-71

2. APPLICATION Kind of industrial property document

☒ Patent of Invention

☐ Utility Certificate

☐ Divided Application

☐ Transformation of a European patent application

> Initial application > ☐ patent of invention ☐ Utility Certificate No. Date

Preparation of search report ☐ deferred ☒ immediate

Applicant, individual person, requires fee payment in installments ☐ Yes ☒No

Title of Invention (maximum 200 characters)

Tire tread and tire containing same

3. APPLICANT(S): SIREN No.: 4.1.4.6.2.4.3.6.9. APE-NAF Code: ------------

Name and first names (underline patronym) or denomination:

		Legal Style
1)	Société de Technologie MICHELIN	Public company
2)	MICHELIN RECHERCHE ET TECHNIQUE, S.A.	Public company

Nationality(ies): 1) French 2) Swiss

Full address(es):		Country
1)	23, rue Breschet - 63000 Clermont-Ferrand	France
2)	Route Louis Braille 210 and 12 - 1763 Granges-Paccot	Switzerland

In case more space is needed, add another sheet ☐

4. INVENTOR(S) Applicants are the inventors: ☐ YES ☒ NO

If reply is NO, add a separate explanation.

5. REDUCTION OF FEE RATES: ☐ 1st request ☐ requested prior to deposit: attach copy of grant

6. PRIORITY STATEMENT OR APPLICATION FOR BENEFIT OF FILING DATE OF DEPOSIT OF A PREVIOUS APPLICATION

Country of origin	Number	Date of Deposit	Kind of Application

+7. DIVISIONS Prior to the present application

No.	Date	No.	Date

8. SIGNATURE OF APPLICANT OR AGENT

Name and Title of Signatory -- Registration No.

For MFPM - Agent 422-5/S.020

[Signature illegible] Signature of official upon receipt

Signature after registration of application at the NIIP

[Great seal on every page:] FRENCH REPUBLIC
NATIONAL INSTITUTE OF INDUSTRIAL PROPERTY

The present invention concerns a tire tread and a tire containing same. The invention applies, notably, to the quality of radio wave reception from a radio set installed on a vehicle equipped with such tires, particularly on a passenger vehicle.

It is known that the tires of a vehicle are charged and discharged by triboelectric effect on running and that such charge and discharge sometimes interfere with the radio set that is installed in the vehicle, particularly when said set is used in amplitude modulation. These interferences occur notably on running over electrically conductive road sections, such as metal joints of a bridge or manhole covers, by reason of sudden discharges on those sections of the charge previously accumulated by the tire tread.

For the same running surface, it is also known that those sudden discharges and the radio interferences that can result therefrom are all the more marked as the tread material is more electrically insulating.

Now, it so happens that many current tires are characterized by a high content of non-electrically conductive reinforcing filler, such as silica, with the intended advantageous effect of reducing hysteresis losses during travel and, consequently, the rolling resistance of the tires, so that the fuel consumption of the corresponding vehicle is likewise reduced.

One disadvantage of these tires resides in the relatively high resistivity of the tread material, which sometimes has the effect of generating radio interferences detectable inside the vehicle under certain weather conditions.

The object of the present invention is to propose a tire tread and a tire containing same, said tread, based on an electrically insulating material, being laterally defined by two sidewalls joining together radially inner and outer faces, which make it possible to

minimize the radio interferences sometimes detected on travel in a vehicle equipped with such tires, notably, on listening in amplitude modulation.

For that purpose, a tire tread according to the invention contains on its circumference at least one conductive layer appreciably joining the said sidewalls, said layer having a resistivity less than that of the said insulating material, which is provided on both sides of said layer or of each layer in said tread.

This tread structure, when used for a set of tires equipping a vehicle with an installed radio receiver, makes it possible, notably, to reduce significantly the radio interferences which can be detected in amplitude modulation, upon running over electrically conductive road sections under certain weather conditions.

According to another characteristic of the invention, the said conductive layer or each conductive layer is roughly parallel to said outer face.

The resistivity of said conductive layer is preferably less than or equal to $10^8\,\Omega$.cm, the resistivity of the said insulating material being greater than or equal to $10^8\,\Omega$.cm.

According to another characteristic of the invention, the said tread contains a single conductive layer provided at a distance from both of said inner and outer faces which is greater than or equal to one-quarter of the thickness of said tread.

Said distance is preferably equal to half the thickness of said tread.

According to a variant embodiment of the invention, the said tread contains at least one conductive film, which is provided to connect the said inner and outer faces electrically.

The said tread preferably contains two conductive films which are respectively provided on the locations of the said sidewalls.

Said films are even more preferably extended respectively to the location of two circumferential peripheral zones of the said outer face.

The aforesaid characteristics of the present invention, as well as others, will be better understood by reading the following description of a working example of the invention, given by way of illustration and without limitation, said description relating to the attached drawings, among which:

Fig. 1 is a schematic view in radial section of a tread according to the invention,

Fig. 2 is a schematic view in radial section of a tread according to a variant embodiment of the invention, and

Figs. 3, 4 and 5 are test graphs illustrating the sound level of the radio interferences in amplitude modulation which were detected under identical conditions on running with tires on conventional tread, on tread according to Fig. 1 and on tread according to Fig. 2.

The tread 1 represented in Fig. 1 presents a roughly trapezoidal radial section solely for purposes of simplification. It is to be understood that any shape deemed appropriate, including tread patterns, could be presented for the type of tire chosen.

This tread 1 is defined by a radially inner face 2 intended to lie opposite the different reinforcements of a tire (not represented), by a radially outer face 3 intended to turn on contact with the ground, and by two sidewalls 4 and 5 connecting the two opposite pairs of lateral edges 6, 7 and 8, 9 of the said faces 2 and 3.

The tread 1 has an electrically insulating base, consisting, for example, of a nonconductive reinforcing filler, such as silica.

As can be seen in the example of Fig. 1, the tread 1 contains on its circumference a conductive layer 10 which appreciably joins the said sidewalls 4 and 5, so that the aforementioned insulating material is provided on both sides 11 and 12 of said layer 10.

In the example of Fig. 1, the tread 1 contains a single conductive layer 10 which is provided roughly parallel to the said outer face 3.

However, a tread 1 according to the invention could contain a plurality of such conductive layers 10, as long as said insulating material is provided on both sides of each layer 10.

More specifically, the conductive layer 10 in the example of Fig. 1 is situated at a distance away from either of the said inner and outer faces 2, 3 which is preferably greater than or equal to one-quarter the thickness of the tread 1.

As can be seen in this working example, said conductive layer 10 is even more preferably placed at equal distance from said inner and outer faces 2 and 3.

It will be observed that a conductive layer 10 according to the invention is characterized by a resistivity less than that of the zone 13 occupied by said insulating material in the tread 1.

By way of example, the resistivity of said conductive layer 10 is designed to be less than or equal to 10^8 Ω.cm, while the resistivity of said insulating material is intended to be greater than or equal to 10^8 Ω.cm.

The conductive layer 10 consists, for example, of an elastomer compound filled with carbon black, the carbon black content being determined by the resistivity sought.

Furthermore, said conductive layer 10 advantageously has a thickness ranging between 0.5 mm and 2.5 mm, for a total thickness of tread 1 averaging around 1.2 cm.

Tests were conducted with tires, each containing a tread 1 of the type illustrated in Fig. 1.

They revealed, inside a vehicle equipped with a radio receiver operating on amplitude modulation and tested while traveling on a road containing metal road sections, such as manhole covers and/or metal bridge joints, a significant reduction of the radio interferences which can be detected on passage over these sections under certain weather conditions.

This results in a notable improvement in listening convenience for passengers.

Fig. 2 illustrates a variant embodiment of the tread 1 of Fig. 1, the elements of same identically repeated there being respectively identified by numerical references increased by 100.

A tread 101 according to Fig. 2 is distinguished from the said tread 1 in that it further contains at least one radial conductive film 114 which is provided to make an electric connection of the outer face 103 to the inner face 102 of the said tread 101.

In the working example of Fig. 2, it can be seen that the tread 101 contains two conductive films 114 which are respectively provided on the locations of the sidewalls 104 and 105 of said tread 101 and preferably on the location of two circumferential peripheral zones 115 of said outer face 103 respectively extending the said films 114.

Tests were also conducted with tires each containing a tread 101 of this type, and a significant reduction of possible radio interferences was thus revealed inside a vehicle equipped with a radio receiver operating on amplitude modulation and tested on running over a road containing the aforesaid metal sections.

With reference to the working examples just described, it is to be noted that the axial conductive layers 10, 110 according to Figs. 1 and 2 do not, in practice, each present a strictly linear radial section like the one schematically represented, but a more of less irregular section resulting from the pressure stresses inherent to molding of the tire. Each conductive layer 10, 110 could, for example, present a radial section that is appreciably rippled or in the form of broken lines, provided that it extends between the said sidewalls 4, 104 and 5, 105 and over the entire circumference of the tire incorporating it.

The tests performed are now going to be described, on the one hand, with a first set of tires with tread 1 according to Fig. 1 and, on the other, with a second set of tires with tread 101 according to Fig. 2. Those tests were conducted in comparison with a "control" set of tires, characterized by an insulating tread, of resistivity greater than or equal to 10^8 Ω.cm.

These tests consisted of quantifying the radio interferences detected in amplitude modulation, on travel of a test vehicle successively fitted with those sets of tires, by amplification and analysis of the corresponding signals recorded on a loudspeaker.

These tests were conducted under the same weather conditions (temperature 17^0C, outdoor humidity level 18%, outdoor dew point temperature -7°C) and under the same running conditions (road sections containing manhole covers, running speed 70 km/h).

Furthermore, a frequency of 1386 kHz was used for the radio receiver installed on the test vehicle, corresponding to an amplitude modulation, with the same amplification of the signal emitted by the radio receiver in all the tests.

The tires of each of the sets tested had a tread approximately 1.2 cm thick. As for the tires with tread 1, 101 according to the invention, belonging to the first and second sets, each axial conductive layer 10, 110 had a thickness of 0.5 mm and a resistivity less than or equal to 10^8 Ω.cm.

With regard to the tread 101 of the tires of the said second set, the two radial conductive layers 114 had, for example, a thickness of 0.5 mm and a resistivity also less than or equal to 10^8 Ω.cm.

As for the resistivity of the said insulating material of each tread 1, 101, it was made equal to that of each tread of the said "control" set, that is, greater than or equal to 10^8 Ω.cm.

The test results are illustrated by the graphs of Figs. 3, 4 and 5, which refer respectively to the said "control" set, to said first set and to said second set of tires and which represent averages, over several runs, of the potential of the signal recorded in amplitude modulation (expressed in V) as a function of time (expressed in ms).

It can be seen in Fig. 3 that, for the "control" set of tires, running of the vehicle on metal sections generates on the loudspeaker mean interference values of relatively high amplitudes (1.62 V and 1.79 V respectively for the pairs of front and rear tires). These mean potential values, called "V_{rms}" by the expert, are calculated by discrete quadratic mean on an acquisition time window.

As can be seen in Fig. 4, the first set of tires according to the invention generates mean interference values V_{rms}, the amplitudes of which are very appreciably reduced relative to the said "control" set (0.66 V and 0.72 V) for the pairs of front and rear tires respectively, the reduction being approximately 60%).

As can be seen in Fig. 5, the second set of tires according to the invention generates mean interference values V_{rms}, the amplitudes of which are further reduced relative to said second set (0.16 V and 0.21 V, for the pairs of front and rear tires respectively, the reduction being approximately 90%).

As can be seen in Figs. 4 and 5, it is to be noted that the duration of each interference relative to said first and second sets of tires is also considerably reduced, compared to the "control" set.

In conclusion, the result of these tests is a listening convenience satisfactory to the passenger or passengers of a vehicle equipped with tires according to the invention.

CLAIMS

1) Tire tread (1, 101), laterally defined by two sidewalls (4, 104 and 5, 105) joining radially inner and outer faces (2, 102 and 3, 103), said tread (1, 101) having a base of an electrically insulating material, characterized in that it contains on its circumference at least one conductive layer (10, 110) appreciably joining the said sidewalls (4, 104 and 5, 105), said layer (10, 110) having a resistivity less than that of said insulating material, which is radially provided on both sides (11, 111 and 12, 112) of said layer (10, 110) in said tread (1, 101).

2) Tread (1, 101) according to Claim 1, characterized in that the said conductive layer or each conductive layer (10, 110) is roughly parallel to the said outer face (3, 103).

3) Tread (1, 101) according to one of Claims 1 or 2, characterized in that the resistivity of said conductive layer (10, 110) is less than or equal to $10^8\,\Omega$.cm, the resistivity of the said insulating material being greater than or equal to $10^8\,\Omega$.cm.

4) Tread (1, 101) according to Claim 2 or 3, characterized in that it contains a single conductive layer (10,110) placed at a distance from both of said inner and outer faces (2, 102, and 3, 103) which is greater than or equal to one-quarter the thickness of the said tread (1, 101).

5) Tread (1, 101) according to Claim 4, characterized in that said distance is equal to half the thickness of the said tread (1, 101).

6) Tread (101) according to one of the foregoing claims, characterized in that it contains at least one conductive film (114), which is provided to connect the said inner and outer faces (102, 103) electrically.

7) Tread (101) according to Claim 6 characterized in that it contains two conductive films (114) which are respectively provided on the locations of the said sidewalls (104 and 105).

8) Tread (101) according to Claim 7 characterized in that said films (114) are respectively extended to the location of two circumferential peripheral zones (115) of said outer face (103).

9) Tire, characterized in that it contains a tread (1, 101) according to one of the foregoing claims.

TRANSLATION ACES INC.
29 Broadway ◆ Suite 2301
New York, NY 10006-3279
Tel. (212) 269-4660 ◆ Fax (212) 269-4662

AFFIDAVIT OF ACCURACY

STATE OF NEW YORK)
) ss.:
COUNTY OF NEW YORK)

I, the undersigned, being duly sworn, depose and state:

I am qualified to translate from the French language into the English language by virtue of being thoroughly conversant with these languages and, furthermore, having translated professionally from French to English for more than 10 years;

I have carefully made the translation appearing on the attached and read it after it was completed; and said translation is an accurate, true and complete rendition into English from the original French-language text, and nothing has been added thereto or omitted therefrom, to the best of my knowledge and belief.

Maurice Robins

TRANSLATION ACES, INC.
BERTRAND LANGUAGES INC.

Subscribed and sworn to before me

this 17th day of May , 2004.

Karyn L. Tasens
KARYN L. TASENS
Notary Public, State of New York
No. 31-4680695
Qualified in New York County
Commission Expires Oct. 31, 2006